MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

TAT 3131 – AGENT TECHNOLOGY

(All sections / Groups)

12 October 2017
9:00am – 11:00am
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of **SIX pages**, which includes the front cover, with **FIVE Questions** only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the answer booklet provided, and start each question on a new page.

Question 1 [12 marks]

(a) Multiagent system is interdisciplinary, which is a study combining knowledge and practices from logic, social sciences, game theory, economy, philosophy, ecology and etc.

(i) Two key problems to the design of a multiagent system are *agent design* and *society design*. Explain each key problem.

[2 marks]

(ii) Many viewpoints have been drawn to describe multiagent systems. One of these viewpoints is *multiagent agent systems are just all about artificial intelligence*. Comment on this viewpoint.

[3 marks]

(b) An agent system is flexible.

(i) List three aspects of flexibility. Then, explain each aspect of flexibility.

[3 marks]

(ii) Apart from flexibility, what are another two desirable properties of an agent system? Explain each of these two properties.

[2 marks]

(c) Personal agents are information agents.

(i) Explain the role of a personal agent.

(ii) Apart from personal agents, list another type of information agent.

[2 marks]

Continued.....

Question 2 [12 marks]

(a) A multiagent system has a form of organisation that defines roles, relationships and authority structures among its members (in this case, members are referred to as *agents*). Two types of organisation of a multiagent system are:
(i) Holarchies
(ii) Team
Explain the characteristics of the above two types of organisation.

[4 marks]

(b) Many problems could not be solved using symbolic artificial intelligence. One of the direction to solving these problems is the development of agent systems comprising a reactive architecture. For example, Brooks (1986) built a mobile robot based on a *subsumption architecture.*
(i) What is this *subsumption architecture*? Explain it.

[4 marks]

(ii) The Steels' Mars Explorer system (Wooldridge, 2009) is another application of *subsumption architecture.* Explain the operation of this system.

[4 marks]

Reference
Brooks, R. (1986), "A Robust Layered Control System for a Mobile Robot", *IEEE Journal on Robotics and Automation*, vol. 2, no. 1, pp. 14-23.

Wooldridge, M. (2009). An introduction to MultiAgent systems (2nd ed.). John Wiley & Son.

Continued.....

Question 3 [12 marks]

(a) Two popular auctions are the English auction and the Vikrey auction.

(i) Describe each of the two auctions mentioned above.

[2 marks]

(ii) Both auctions could be manipulated by bidder collusion. Explain how this collusion could happen in each type of auctions.

[2 marks]

(b) Negotiation is another approach to reaching agreement on a matter of interest. List and then explain four components of a negotiation setting among agents in a system.

[4 marks]

(c) What is the difference between theoretical reasoning and practical reasoning? Provide an example to explain each type of reasoning.

[4 marks]

Continued.....

Question 4 [12 marks]

(a) Explain the following phrases:
(i) zero-sum game
(ii) rational choice

[2 marks]

(b) The table below shows the profits of two detergent companies (Dynama and Toppe) of advertising or not advertising their products. The profits of the two companies are indicated in an amount in the unit of RM 100000.

		Dynama			
		Advertising		Not advertising	
Toppe	Advertising	60	60	80	50
	Not advertising	50	80	70	70

(i) What is the dominant strategy of Toppe? Justify your answer.

[3 marks]

(ii) What is the dominant strategy of Dynama? Justify your answer.

[3 marks]

(iii) Are the strategies chosen by Toppe and Dynama a scenario of the dilemma of the prisoners? Explain why.

[2 marks]

(iv) Are the strategies chosen by Toppe and Dynama in a Nash equilibrium? Explain why.

[2 marks]

Continued...

Question 5 [12 marks]

(a) Explain the following three aspects of speech acts. Explain the following three aspects of speech acts. Give an example for each speech act.

(i) Locutionary act

(ii) Illocutionary act

(iii) Perlocutionary act

[3 marks]

(b) The knowledge query and manipulation language (KQML) and the knowledge interchange format (KIF) are used to exchange messages among agents.

(i) Explain the role of KQML and KIF in message generation and exchange.

[2 marks]

(ii) Convert the following dialogue into KQML/KIF format.

Ag1 asks Ag2: Is the length of a pencil greater than the length of an eraser?
Ag2 replies Ag1: Yes
Ag2 informs Ag1: The length of a pencil is 15cm

[3 marks]

(c) The Foundation for Intelligent Physical Agents (FIPA) defined "Inform" and "Request" as two basic performatives made up of two parts: pre-condition and rational effect. Explain each of these two FIPA performatives.

[4 marks]

End of Paper